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Colorimetric Determination of Arsenic in Natural Waters by Nanomaterial-Based Test Strips

A novel colorimetric method based on a nanocomposite test strip has been developed to detect arsenic (Asv) in natural waters. The method employs a simple vacuum-driven filtration process in which water samples are filtered through a supporting cellulose membrane doped with MoO42–(or molybdenum blue) in NR3+ nano-dispersion. The nanocomposite membrane was capable of detecting Asv species at concentration levels as low as 10 ppb. The intensity of blue color on the test strip at this level of detection was visible to the naked eye. A non-linear calibration curve for Asv analysis as determined by colorimetry yielded correlation of 0.995, and the detection limit (at three standard deviations, 3) was determined to be 5.54 ppb. The standard deviation of the Asv detection procedure at the 100 ppb level for 10 samples was determined to be ±3.71ppb that indicated good precision. Uniformity of prepared membranes, effect of pH, and the reliability of using the molybdate/latex doped membranes will be discussed.

Primary author: Ms PRASERTSOM, Ratchaneegorn (AIT)

Presenter: Ms PRASERTSOM, Ratchaneegorn (AIT)

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